Effectiveness of a geriatric day hospital

D. Joan Eagle, MSc; Gordon H. Guyatt, MD; Christopher Patterson, MD; Irene Turpie, MB; Barbara Sackett, MSc; Joel Singer, PhD

Objective: To determine whether there is a difference in the quality of life between elderly patients managed in a day hospital and those receiving conventional care.
Design: Randomized controlled trial; assessment upon entry to study and at 3, 6 and 12 months afterward.
Setting: Geriatrician referral-based secondary care.
Patients: A total of 113 consecutively referred elderly patients with deteriorating functional status believed to have rehabilitation potential; 55 were assessed and treated by an interdisciplinary team in a day hospital (treatment group), and 58 were assessed in an inpatient unit or an outpatient clinic or were discharged early with appropriate community services (control group).
Outcome measures: Barthel Index, Rand Questionnaire, Global Health Question and Geriatric Quality of Life Questionnaire (GQLQ).
Main results: Eight study subjects and four control subjects died; the difference was insignificant. Functional status deteriorated over time in the two groups; although the difference was not significant there was less deterioration in the control group. The GQLQ scores indicated no significant difference between the two groups in the ability to perform daily living activities and in the alleviation of symptoms over time but did show a trend favouring the control group. The GQLQ scores did indicate a significant difference in favour of the control group in the effect of treatment on emotions (p = 0.009).
Conclusion: The care received at the day hospital did not improve functional status or quality of life of elderly patients as compared with the otherwise excellent geriatric outpatient care.

Objectif : Préciser s'il existe une différence de qualité de vie entre les malades âgés traités dans un établissement de jour et ceux recevant des soins conventionnels.
Conception : Essai aléatoire contrôlé; évaluation à l'admission à l'étude et à 3, 6 et 12 mois par la suite.
Cadre : Soins secondaires gériatriques demandés par le médecin.
Malades : Au total, 113 malades âgés aiguillés par leur médecin, dont l'état fonctionnel se détériorait et dont on croyait la réadaptation possible; 55 ont été évalués et traités par une équipe interdisciplinaire dans un établissement de jour (groupe de traitement) et 58 ont été évalués dans un service pour malades hospitalisés ou de consultations externes ou ont reçu leur congé tôt, avec services communautaires appropriés (groupe-témoin).
Mesure des résultats : Index Barthel, questionnaire Rand, questionnaire sur l'état général de santé et questionnaire sur la qualité de vie en gériatrie (QQVG).

Ms. Eagle is associate professor, School of Nursing, McMaster University, Hamilton, Ont. Dr. Guyatt is associate professor, departments of Clinical Epidemiology and Biostatistics and of Medicine, McMaster University. Dr. Patterson is associate professor and head, Division of Geriatric Medicine, McMaster University. Dr. Turpie is director, Geriatric Services, St. Joseph's Hospital, Hamilton, Ont., and associate professor, Department of Medicine, McMaster University. Mrs. Sackett was research coordinator, School of Nursing, McMaster University. Dr. Singer was assistant professor, Department of Family Medicine, McMaster University.

Dr. Guyatt is a career scientist of the Ontario Ministry of Health.

Reprint requests to: Ms. D. Joan Eagle, School of Nursing, Rm. 2J40E, Faculty of Health Sciences, McMaster University, 1200 Main St. W, Hamilton, ON L8N 3Z5

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Principaux résultats : Huit sujets du groupe de traitement et quatre du groupe-témoin sont décédés; la différence était peu importante. L'état fonctionnel s'est détérioré au fil du temps dans les deux groupes; même si la différence n'était pas importante, on a constaté moins de détérioration dans le groupe-témoin. Les notes du QQVG ne montrent aucune différence importante entre les deux groupes, pour ce qui est de la capacité de se livrer aux activités de la vie quotidienne, non plus que sur le soulagement des symptômes avec le temps, mais laissent voir une tendance favorisant le groupe-témoin. Les notes du QQVG indiquent une différence importante en faveur du groupe-témoin, en ce qui a trait à l'effet du traitement sur le plan affectif ($p = 0,009$).
Conclusion : Les soins reçus à l'établissement de jour n'ont pas amélioré l'état fonctionnel ou la qualité de vie des malades âgés comparativement aux soins excellents en gériatrie des services de consultations externes.

Geriatric day hospitals, introduced in Britain in the 1950s, play a major role in the British health care system and are being seen increasingly in North America. Day hospitals offer the potential for interdisciplinary assessment and rehabilitation (including hospital-based services such as laboratory and specialized diagnostic facilities) without the need for hospital admission, improve the patient's quality of life and reduce the burden on the family caregiver.

A previous review of the literature concerning the effectiveness and cost of geriatric day hospitals had revealed many enthusiastic descriptive studies and four randomized controlled trials (RCTs).[1] Only one of the four RCTs showed that the improvement in physical and emotional function was greater among subjects treated at a day hospital than among those treated conventionally.[2] Each RCT had its limitations, including one common to all health services research — uncertainty about the generalization of the findings to other settings.

We therefore conducted an RCT to compare the quality of life between patients managed in a geriatric day hospital and those receiving conventional care. There are at least two important differences between this trial and the four previous RCTs. First, the patients in our conventional care group received more specialized care and community support. Second, our measurement of functional status was more sophisticated.

Methods

Day hospital program

The Chedoke–McMaster Day Hospital, Hamilton, Ont., was established in October 1984 and occupies part of an existing building of the Chedoke Division of the Chedoke–McMaster Hospitals. The Chedoke Division is a teaching hospital of McMaster University that delivers secondary and tertiary care to the Hamilton–Wentworth region.

The facilities of the day hospital include areas for physical and occupational therapy, a small living-room for practising activities of daily living, an indoor garden, a workshop, a crafts room, a kitchen and a communal area for dining and group activities. One of the three bathrooms is equipped with a full bathtub and shower for retraining in daily living activities.

During the study period patients attended the day hospital 2 days per week, each visit lasting 4 to 5 hours. Initially an interdisciplinary team assessed physical, mental and emotional function, medical diagnoses, drug therapy, family and social relationships and visual, hearing and rehabilitation needs. Team members included the day hospital physician (a general practitioner with additional training in geriatrics who was responsible for day-to-day patient care and implementation of the management plan), three registered nurses (one of whom was the nurse coordinator), a registered nursing assistant, occupational, physical and speech therapists, a nutritionist, a social worker and a pharmacist.

The nurse coordinator was there at all times. The other two nurses were part-time employees and were called upon if the number of patients was sufficient. The occupational, physical and speech therapists and the social worker participated on most days. The nutritionist and pharmacist were available when needed.

After the assessment phase (involving one to three visits) the team met to plan the necessary therapeutic and rehabilitative services, which were provided until the patients could manage their daily activities confidently and function relatively independently. A meeting to plan discharge often included relatives and caregivers. If necessary, arrangements were made for therapy to continue in the patient's home.

Patient population

From April 1986 to October 1987 we recruited subjects who had been referred from the community to one of the two consultant geriatricians (C.P. and I.T.) at the day hospital or were about to be discharged from an acute-care inpatient setting. To be eligible to attend the day hospital the patients had to be 65 years of age or older, have impaired

function to the extent that independence in their present living arrangement was threatened, have no acute illness and a positive prognosis for long-term improvement and be living at home or in a home for the aged in the Hamilton-Wentworth region. Patients were excluded if their life expectancy was less than 6 months or their illness or disability required 24-hour monitoring.

Before randomization the participating geriatricians had to specify which type of conventional care the patients would receive if assigned to the control group. The patients were subsequently stratified according to the type of conventional care: management in the inpatient geriatric assessment unit for comprehensive assessment and treatment, management in the outpatient geriatric clinic, with limited diagnostic and rehabilitative opportunities, or early discharge from a medical-surgical inpatient unit and appropriate community follow-up services. Using a randomized block design with a blocking factor of four and the three strata we randomly assigned the eligible patients to receive care at the day hospital (treatment group) or to receive conventional care (control group).

The inpatient assessment unit's primary purpose was diagnostic assessment and comprehensive treatment of elderly patients with complex medical problems; it offered services similar to those of the day hospital. The outpatient clinic was staffed by a full-time registered nurse, a registered nursing assistant, one or more medical residents and the same two consultant geriatricians. Social services and physical, occupational and speech therapy were available as required. Patients were seen at the clinic (primarily for monitoring purposes) about every 4 to 6 weeks.

For the most part the same health professionals provided the care to the subjects in the two groups. Thus, any differences between the two groups would be considered to be attributable to the unique features of the day hospital.

Functional status

A brief mental status questionnaire was administered to all patients upon entry to the study.[3] In addition, the patient's quality of life was measured upon entry with the use of the Geriatric Quality of Life Questionnaire (GQLQ), which was developed specifically for this study according to established principles;[4,5] in brief, the GQLQ is a person-specific measurement containing 25 items in three categories: activities of daily living, symptoms, and feelings or emotions generated by the person's health status. All patients, regardless of their score on the mental status questionnaire, were assessed for (a) functional status, as measured by the Barthel Index[6] and the Rand Questionnaire,[7] (b) emotional function, as measured by the Rand Questionnaire,[8] and (c) overall health status, as measured by the Global Health Question (GHQ) "Generally speaking, how has your overall health been over the past 2 weeks?" The patients were asked to rate their perception on a seven-point scale, seven being the best response. The study patients with a mental status score of 7 or more were given the GQLQ again at 3, 6 and 12 months.

Finally, each family caregiver was asked to rate the patient's performance with the use of the Barthel Index, the GHQ and the Rand Questionnaire. The caregiver was usually a spouse or cohabitant who assisted the patient with daily activities over a 24-hour period. The patient was also asked to use the Barthel Index to rate his or her own performance. If the patient was admitted to an acute-care or long-term care institution or was too ill to respond meaningfully the health care professional (usually a nurse) rated the patient.

We measured the use of resources in detail. In this report we have included the number of hospital days used by the two groups. Data regarding resource allocation are being analysed and will be published later. We also monitored the rates of death and admission to an institution.

Data analysis

Effects of treatment and time on quality of life were determined by means of repeated measures analysis of variance of the GQLQ, GHQ, Rand and Barthel Index scores at 3, 6 and 12 months after entry to the study, the baseline scores being the covariate. If the patient's own rating was unavailable because of incapacitating illness the caregiver's rating was substituted. Each of the three dimensions of the GQLQ was analysed separately. A Fisher's exact test was used for dichotomous variables. The 95% confidence intervals (CIs) around differences between the two groups were calculated. A positive sign in front of a number represented a difference in favour of the treatment group and a negative sign a difference in favour of the control group.

Results

Comparability and follow-up

Of the 128 patients asked to participate in the study 15 refused. Of those who participated 78% were referred from the community and the remainder from inpatient services. Fifty-five patients were allocated to the day hospital and 58 to the control group. The distribution of conventional treatment among the patients before randomization was as

follows: outpatient care 80 patients, inpatient care 9 and early discharge with appropriate community services 24. The distribution after randomization among the 58 control subjects was 40, 5 and 13 respectively. Randomization was effective in that the two groups were comparable with respect to age, sex, presence of a caregiver at home and number of patients with two of the three most common medical problems; however, depression was more frequent in the control group (Table 1). Of the 58 control subjects 53 were managed initially in the community and 5 in hospital.

The fate of all the patients was ascertained, and the Barthel Index scores of all surviving patients were obtained at the 12-month follow-up visit.

Death and admission to an institution

Of the 12 patients who died during the study 8 (14%) were in the treatment group and 4 (7%) in the control group. Although the difference favoured the control group it was not significant ($p = 0.23$, 95% CI −17% to +5%). These patients were not considered further in the analysis.

Of the surviving patients 36 treatment subjects (76%) and 44 control subjects (81%) were living at home at the time of the 12-month follow-up, and the remainder were in an institution; the difference between the two groups was not significant ($p = 0.81$, 95% CI −18% to +13%).

Functional status and quality of life

The mean Barthel Index scores are shown in Fig. 1. The scores are based on the total patient sample. Functional status clearly deteriorated in the two groups over time, but to a lesser extent in the control group. Although the deterioration was very unlikely to have occurred by chance ($p = 0.002$) the difference in the rates of deterioration between the

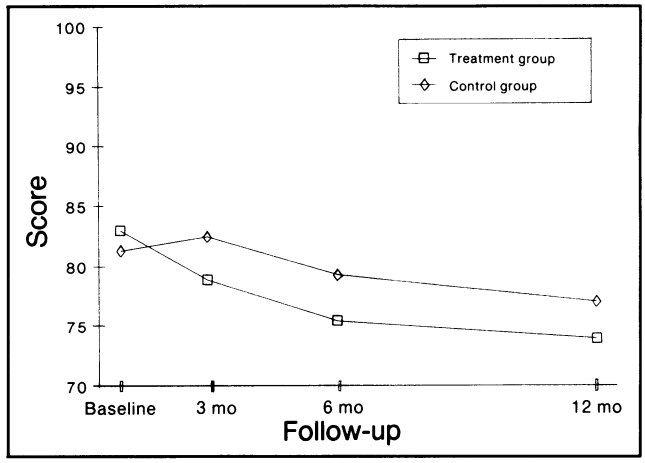

Fig. 1: Mean Barthel Index scores for functionally impaired elderly patients upon entry to study (baseline score) and at 3, 6 and 12 months afterward. Treatment group comprised patients randomly assigned to receive care at day hospital; control group comprised patients randomly assigned to receive conventional care.

Table 1: Characteristics of functionally impaired elderly patients who received care at a day hospital (treatment group) or conventional care (control group)

Characteristic	Treatment group (n = 55)	Control group (n = 58)
Mean age (and standard deviation [SD]), yr	79.6 (6.7)	78.2 (7.6)
No. of men (and %)	20 (36)	25 (43)
No. (and %) who lived with caregiver	35 (64)	34 (59)
No. (and %) with most common primary medical problems		
Depression	10 (18)	22 (38)
Cerebrovascular accident	13 (24)	13 (22)
Degenerative joint disease	8 (14)	11 (19)
Mean scores		
Mental status questionnaire	6.8	7.6
Global Health Question (GHQ)	4.26	4.09
Rand Questionnaire		
Physical function	38.6	39.4
Emotional function	21.1	20.8
Geriatric Quality of Life Questionnaire (GQLQ)*		
Activities of daily living (ADL)	4.49	4.46
Emotional function	4.66	4.52
Symptoms	3.56	3.79

*Only the 60 patients with mental status appropriate for completing the GQLQ are included here.

two groups was insignificant ($p = 0.18$, 95% CI −11.3 to +1.6). In neither this nor any other analysis did the interaction between time and treatment approach conventional levels of statistical significance.

The results of other measures are in Table 2. The GHQ ratings were essentially constant during the study period in the control group but decreased in the treatment group ($p = 0.012$); the differences between the two groups were unlikely to have occurred by chance. Thirty-three treatment subjects (60%) and 37 control subjects (64%) were able to complete the GQLQ upon entry; 28 (51%) and 30 (52%) respectively were able to complete it at the end of the study period. The ability to perform daily living activities decreased significantly over time in the two groups ($p = 0.05$); this deterioration was unlikely to have been due to chance. Although there was no significant difference between the groups in treatment effect the trend favoured the control group: it showed improvement in the ability to perform such activities at the 3-month follow-up before deterioration began. There was a significant treatment effect in favour of the control group on the emotions dimension of the GQLQ ($p = 0.015$). The two groups showed significant alleviation of symptoms over time ($p = 0.009$), the trend favouring the control group (Table 2).

Use of resources

The treatment group spent 37 fewer days in hospital than the control group did (Table 3). However, 1349 of the 1388 days were spent in the day hospital. The data include a patient in the treatment group who was admitted to hospital 13 times and spent 151 days on inpatient wards.

Discussion

The strengths of this study include the design, attention to rigorous measurement of quality of life and complete follow-up. The main limitation was that we were unable to blind the patients, caregivers and study personnel administering the questionnaires and instruments for measuring functional status to the study groups. However, the interviewers had no connection with the day hospital before the study began and were carefully trained to administer measurement instruments in a standardized fashion.

A difficult problem in the analysis of our data was how to deal with the patients who died. If the day hospital had saved lives, which would have led to more of the severely disabled patients surviving in the treatment group but dying in the control group, a bias could have resulted. The exclusion from the analysis of functional status of those who died could

Table 3: Use of health care resources

Resource	Treatment group	Control group
Geriatric inpatient unit		
No. of admissions	0	5
No. of hospital days	0	231
Intensive or cardiac care unit		
No. of admissions	11	8
No. of hospital days	82	64
Inpatient ward		
No. of admissions	47	38
No. of hospital days	1306	1056
Total		
No. of admissions	58	51
No. of hospital days	1388	1351

Table 2: Mean scores of four outcome measures

Measure; group	Follow-up; score*			Variable; *p* value		95% confidence interval†
	3 mo	6 mo	12 mo	Time	Treatment	
GHQ‡						
Treatment	4.08	3.75	3.85	0.63	0.012	−0.89 to −0.11
Control	4.35	4.49	4.33			
GQLQ‡						
Symptoms						
Treatment	3.74	4.00	4.04	0.009	0.17	−0.80 to +0.14
Control	4.12	4.32	4.33			
ADL						
Treatment	4.38	4.43	4.01	0.05	0.29	−0.92 to +0.28
Control	4.71	4.63	4.43			
Emotions						
Treatment	4.58	4.60	4.40	0.30	0.019	−1.13 to −0.13
Control	5.03	5.24	5.22			

*All scores were adjusted for baseline scores.
†Confidence interval was around treatment effect.
‡GHQ data were from 39 patients in the treatment group and 45 in the control group; GQLQ data were from 28 patients in the treatment group and 30 in the control group.

have favoured the control group, since those who were severely disabled remained in the treatment group but not the control group. As it turned out there were eight deaths in the treatment group and four in the control group. If this bias was present the results would have been skewed in favour of the treatment group.

Although a number of the outcome measures reached statistical significance in favour of the control group others did not. A study such as this is subject to the problem of multiple comparisons, and results must be interpreted cautiously. Likely the trends in functional status measures that favoured the control group occurred by chance.

Another issue that is important in any trial with negative results is the power to exclude a clinically important benefit in favour of the treatment group. Insight into this issue can be gained by examining the CI around the difference between the groups. The upper limit of the CI represents the largest difference in favour of the treatment group that is compatible with the data. In this study, for every outcome measure the upper limit of the CI excluded a clinically important benefit of the day hospital. Thus, there was sufficient power to exclude an important effect of the day hospital in comparison with the conventional care.

Generalization of the results to another setting may not be warranted. Our study differed from previous trials in that it was conducted in a more "socialized" medical system. There are no financial barriers to physician or hospital care within the Canadian context. All of the control subjects were assessed by an experienced geriatrician. Not only was the control group's access to care not hindered by financial barriers, but waiting times were not excessively long; also, our region has the well-established Hamilton-Wentworth Home Care Program, to which the control group had access. In settings in which this is not the case access to care at a day hospital may be beneficial. In addition, a population different from ours (e.g., a less disabled group) may benefit from such care. Although we were unable to detect a trend suggesting benefit to less disabled patients (in fact, the statistically significant results in favour of the control group were from the less disabled patients) further study of day hospital care among such people may be warranted.

Despite differences in the care provided in the control group and our more sophisticated measurement of health-related quality of life our results are consistent with those of RCTs of geriatric day hospitals in other settings.[1,9] Only one such trial has shown a benefit of day hospital care, and that benefit reached only borderline levels of statistical significance.[2] Rigorous trials to date, then, offer little support for the hypothesis that care provided at geriatric day hospitals improves function or quality of life in the elderly.

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